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Patentanmeldung Nr.
Patent application no.
Demande de brevet n°

PCT/EP 03/04518

Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation

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Sheet No. ...3...

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A method and a computer system for automated data object processing

Field of the invention

[0001] The present invention relates to the field of automated data object processing and more particularly to the field of automated processing of data objects forming process chains of linked data objects in a data base of a computer system.

Description of the Related Art

[0002] There are many cases and situations in which data objects contained in a data base are linked to each other so as to form process chains, i.e. the data objects linked to each other describe a development or the history of a process or an order of events. In this context, the term "process chain" does not only describe a mere one-dimensional sequence of data objects but also more-dimensional and complex chainings, networkings or meshings, i.e. a complex branch construct.

[0003] One example for data objects forming process chains of linked data objects, but not limited to, is in the field of calculation and remuneration of commission cases. Commission cases occur in the context of various business fields where employees or agents receive bonus or commission payments on the basis of achieved objects, such as for example in the field of insurance companies where an employee or agent receives commission payments when he sells an insurance policy etc. However, there are many other areas in sales and services where commission cases are handled. In situations with a complex environment and/or long-term contracts, a whole history of events (commission cases) develops over time which leads to a situation with several data objects, each of which describes a commission case and which are based one on the other over time in a causal relation. In the most simple situation, this relation is a one-dimensional process chain of at least two data objects. As an example for this, Figure 1 illustrates a commission case chain with three commission cases forming a one-dimensional process chain with the oldest case (Case 1) depicted on the left hand side and the younger cases (Case 2 and Case 3) placed subsequently along a time axis showing to the right hand side of Figure 1. Arrows between the respective cases indicate the succession in time.

[0004] As can be seen from Figure 1, each commission case contains respective subobjects which comprise information of what has been done in the commission case. As subobjects are independent of the case, they play an important rule when a chain in commission cases has to be updated. The situation illustrated in Figure 1 could, for example, stand for a life insurance contract which was signed at a given date (Case 1). This led to a commission payment to the employee who sold that life insurance. At a later date, the amount covered by this life insurance was raised which led to a further commission payment to the relevant employee (who could be the same employee as in case 1 or another employee, e.g. a successor to the employee who sold the insurance in the first place). Again later, the amount was raised again (or any other change to the insurance contract took place) resulting in a third commission payment.

[0005] Other, more complex situations exist. For example in the case of health insurances, there could be the case of two single persons with own health insurance contracts and which might comprise additional benefit agreements (getting married and having children with contracts get emerged, cancelled, creating subcontracts and eventually new contracts emerging from subcontracts when the children are grown up). Obviously, there are (basically) no limits to complexity.

[0006] In a situation where a commission case has to be updated, the whole chain of commission cases has to be updated, too, as remuneration amounts can influence other remuneration amounts as the remuneration amounts depend on the remuneration they correct/influence, cases with such remunerations have to be considered when a chain of commission cases is updated. In such a case, subobjects play an important role as they are independent of the case. However, in the systems known from the prior art, it is only possible to update the youngest of the commission cases, i.e. the commission case last posted in the commission case chain.

Summary of the Invention

[0007] It is therefore an object of the invention to provide a data object processing system which allows for fast and reliable updating of process chain data objects even in very complex process chain branch structures. More particularly, it is an object of the invention to provide a data object processing system in which the data objects are consistent after processing of an update. This object is achieved by proposing a method for automated data object processing with the features of claim 1 and a computer system for automated data object processing with the features of claim 7.

[0008] Accordingly, a computing unit of a computer system comprises a selection module, a preparation module and a process module, as well as a data base containing data objects forming process chains of linked data object, the selection module allowing for selection of a data object among the data objects contained in the data base, the preparation module identifying, on the basis of the selected data object, at least one process chain containing the selected data object and determining all of the data objects of the data base which are linked with the selected data object in causal relation, and the process module executing the desired processing of the selected data object and the data object being in causal relation with the selected data object.

[0009] The method according to the invention comprises the steps of

after a data object to be processed has been selected, identifying at least one process chain containing the selected data object to be processed;

determining all of the data objects which are linked with the selected data object in causal relation;

processing the determined data objects and the initial data object.

[0010] Advantageously, the step of processing comprises

subsequently resetting or cancelling one determined data object after the other; and

recalculating, if necessary (i.e. if the determined data object was not cancelled), consecutively the determined data objects reset in the resetting step being in causal relation with the selected data object.

[0011] Preferably, the processing steps are configurable by switches, e.g. a user could define that resetting and recalculation of a determined data object is replaced by cancellation.

[0012] With the invention, it is possible to handle automatically deep and complex networks of data objects such as commission cases within one single process to resolve pending case queues or to recalculate them in changed context.

[0013] Advantageously, the data objects contain a time index, and the resetting of the determined data objects (as executed by the process module) starts with the data object containing the most resent time index and steps back consecutively to the selected data object.

[0014] The invention also covers a computer program with program coding means which are suitable for carrying out a process according to the invention as described above when the computer program is run on a computer. The computer program itself as well as stored on a computer-readable medium is claimed.

[0015] Further features and embodiments of the invention will become apparent from the description and the accompanying drawings.

[0016] It will be understood that the features mentioned above and those described hereinafter can be used not only in the combination specified but also in other combinations or on their own, without departing from the scope of the present invention.

[0017] The invention is schematically illustrated in the drawings by means of an embodiment by way of example and is hereinafter explained in detail with reference to the drawings. It is understood that the description is in no way limiting on the scope of the present invention and is merely an illustration of a preferred embodiment of the invention.

Brief description of the Drawings

[0018] In the drawings,

Figure 1 is a schematic illustration of a conventional data object chain with three data objects, the data objects describing commission cases;

Figure 2 is a schematic view of a data object processing computer system according to the invention;

Figure 3 is a schematic block diagram depicting the three modules of the computer system according to Figure 2;

Figure 4 illustrates by means of a block diagram the processing of linked data object process chains (case chains) according to the invention;

Figure 5 shows a table identifying a sequence of case processing;

Figure 6 is a schematic illustration of processing situations;

Figure 7 is a schematic block diagram representation illustrating a sort order processing;

Figure 8 is a representation according to Figure 7 with additional sorting indications.

Detailed Description

[0019] Figure 2 shows a schematic block diagram representation of a data object processing computer system 10 according to the present invention. Computer system 10 comprises a server or computing unit 12 connected with at least one input/output means 18. A software solution is installed on computing unit 12 comprising three modules, namely a selection module 16, a preparation module 14 and a process module 22. The computing unit 12 is connected to a data base 20 on which a plurality of data objects is stored.

[0020] Figure 3 shows the succession in operation of the three modules selection modules 17, preparation module 14 an process module 22 described above.

[0021] The invention is now described in more detail in connection with commission cases by ways of example only. It is to be understood that the invention can be employed in any other field in which subsequent data objects are linked to each other in a causal relation and influence there contents and/or results. In this context, the term "report" is to be understood as a synonym for "computer program".

[0022] According to the invention selection module 16 selects one or more commission cases that are to be processed, preparation module 14 prepares the cases by finding additional cases, grouping and sorting them, and process module 22 processes the cases determined before.

[0023] Selection module 16 is a module created depending on the context of its use. The selection module 16 could be a report that is based on some selection criteria that select the cases or it could be a report with a user interface that allows the user to select cases based on certain selection criteria, such as a case ID or all cases posted in a certain period of time, or the like. The selected cases are then transferred to the preparation module 14.

[0024] The preparation module 14 requires a selected list of commission cases as input which is provided by the selection module 16. The list of selected cases (selected data objects) is referred to as the list of initial cases (or initial data objects). The preparation step performed in the preparation module 14 needs to locate additional required cases that need to be processed before the initial selected cases can be processed. For example, in the simple case illustrated in Figure 1, if case 1 is selected as the initial case, the preparation module 14 would determine cases 3 and 2 to be processed before case 1 can be processed.

[0025] Advantageously, the cases determined by the preparation module 14 are grouped and sorted. The result of this grouping and sorting could be groups of sorted cases that can later be processed independently. As a prerequisite for the parallel processing, the groups are disjoint.

[0026] The result of the preparation in preparation module 14 is a task list based on the grouped and sorted commission cases which contains a list of instructions on how to handle the cases and which forms the basis for the process module 22 to process the determined commission cases. The arrangement within a group is such that a risk-free and consistent processing by the process module according to the application logics is guaranteed. Further, the group is closed, and if an interruption occurs during processing it can be resumed at the commission case where the interruption occurred.

[0027] Also, the preparation module 22 advantageously provides program interfaces to maintain the initial list of commission cases and to start the preparation.

[0028] Finally, the process module 22 processes the task list generated and provided by the preparation module 14. Preferably, it is possible to start several processing tasks in parallel, each process processing one task list.

[0029] The preparation module 14 and/or the process module 22 preferably each comprise at least one interface. Interfaces for the preparation module 14 are, for example, i) adding a commission case to the list of initial selected commission cases that have to be processed; ii) starting the preparing process (creating the groups, sorting the cases and creating the task lists.) Interfaces for the processing module 22 comprise for example i) maintaining the task list and a list with overall information about the task list; and ii) controlling a possible parallel process.

[0030] Advantageously, when a commission case is processed, both subsequently posted commission cases in the commission case chain, cases that contain rebundled subobjects and commission cases with correction remunerations, can be taken into account.

[0031] Referring now to Figure 4, a commission case chain 30 consisting of four commission cases 1 to 4. As can be seen from the time axis shown on the lower right hand side of Figure 4, case 1 is the oldest case in commission case chain 30 and case 4 is the youngest case.

[0032] Two further commission case chains 32 and 34 are shown in Figure 4, commission case chain 32 comprising cases Y1 to Y3 and commission case chain 34 comprising cases Z1 to Z3. Case Y1 of commission case chain 32 is older than case 1 of commission case chain 30 and case Y2 of commission case chain 32 is younger than case 1 of commission case chain 30. Similarly, case Z1 of commission case chain 34 is older than case 3 of commission case chain 30 and case Z2 of commission case chain 34 is younger than case 3 of commission case chain 30.

[0033] When looking at case 3, it contains a subobject as 3 which is rebundled to case Z2, i.e. case 3 and case Z2 are linked in causal relation. As case Z2 is younger than case 3, this means that case Z2 has to be considered if any of the cases 1 to 3 is selected as an initial case and has to be handled/processed because the valuation for the subobject as 3 could change in case 3 and as a result, the valuations in the cases Z2 and Z3 could change, too. The valuation for an object contains the history of the case chain development and thus produces a concatenation of the case statuses over the time. The valuation also serves as basis for the renumeration.

[0034] When looking at case Y2, it contains a subobject SY2 which is rebundled to case 2, i.e. cases Y2 and 2 are linked in causal relation. However this rebundling is of no importance as the valuations in case Y2 (which is older than case 2) will not change as a result of an update/processing of case 2.

[0035] Figure 5 shows a table containing a list of the tasks which have to be processed depending on which one of the cases 1 to 4 of commission case chain 30 is selected as an initial case.

[0036] The first row identifies the most simple occurrence, i.e. a selection of case 4. As case 4 is the youngest case in commission case chain 30 and not rebundled or linked to any other case, the processing of case 4 comprises parking or locking of case 4 and resolving it.

[0037] Should case 3 be selected as initial case, case 4 is parked first and then cases Z3 and Z2 are parked as subobject as 3 is rebundled from case 3 to case Z2. Afterwards, the cases 3, Z2,Z3 and 4 are resolved. Regarding the terminology used herein, "park" is an example for "reset" as defined above and "resolve" is an example for "recalculate" as defined above.

[0038] If case 2 is selected as initial case, cases 3 and 2 are parked first. Then, case 2 is resolved, and then case 3 is resolved as described above.

[0039] If case 1 is selected as initial case, case 2 has to be parked first as described above. Then case 1 is resolved, and then case 2 is resolved as described above.

[0040] If there is a remuneration amount in the current case that is corrected by a remuneration amount calculated in another case, that case has to be considered, too. The reason is that if the remuneration in the current commission case changes then the correction remuneration might change, too, and therefore the commission case has to be taken into account.

[0041] Figure 6 shows four situations of remuneration corrections, commission case 2 being the case examined.

[0042] The situations indicated with dashed arrows and reference numerals ① and ② are both situations where a remuneration in case 2 corrects/influences a remuneration from another commission case, i.e. case 1 in situation ① and case Y2 in situation ②. These situations do not have to be dealt with because the results of cases 1 and Y2 do not change when case 2 changes. The situations depicted by dashed arrows with reference numerals ③ and ④ indicate situations where a remuneration amount is corrected by a remuneration amount that is part of another commission case, i.e. cases 3 in situation ④ and case Z1 in situation ③. If the remuneration amount in commission case 2 changes, then the correcting remuneration amount could change too. Therefore, these cases have to be dealt with in the same task list and they have to be located/determined during the preparation in preparation module 14.

[0043] As already described above, the process according to the invention consists of the three modules selection module 16, preparation module 14 and process module 22. Selection module 16 provides preparation module 14 with the one or more selected cases. After the preparation module 14 has determined additional cases, grouped and sorted the cases and generated the task list, the task list is provided to process module 22 and processed by said module.

[0044] In detail, preparation module 14 receives a list of initial commission cases provided by selection module 16, which list contains the commission cases that need to be processed. The preparation module 14 then performs the following steps of locating/determining and grouping additional cases, sorting cases inside a group and generating a task list. The step of locating consists in locating additional commission cases that need to be processed before the initial selected case(s) can be processed. All additional commission cases are placed in the same group as the initial case. The commission cases are then sorted into the right order within a given group in order to ensure that the cases are processed in the correct order.

[0045] The sorting step is illustrated in Figure 7. Figure 7 again shows commission case chains 30 and 34 of Figure 4, case 3 of commission case chain 30 being linked to case Z2 of commission case chain 34 due to the rebundled subobject as 3. The situation shown in Figure 7 corresponds to case 1 of commission case chain 30 being selected as initial case. In the first step of preparation module 14, the additional cases 2, 3, 4, Z2 and Z3 where determined as cases to be processed. Case Z1 not having to be processed as it is older than case 3 and thus older than the linkage between case 3 and case Z2, and there is no influence from a change of case 3 or case Z2 on case Z1 (cf Figure 5).

[0046] In the next step the cases are sorted in an order in which they can be processed, i.e. first parked and then resolved. The sort order is indicated in Figure 7 by means of numbers 1 to 6 in squares. As can be seen from Figure 7, case Z2 is the first case parked, then case 4 is parked, followed by case Z2 and cases 3 to 1. This corresponds to the "age" of each case, the age of a case being advantageously determined by a time index contained in each data object. Thus, the sort order indicated in Figure 7 starts with the data object containing the most recent time index (here: case Z3) and then steps back consecutively to the selected data object case 1. When resolving or recalculating the cases, the given sort order is processed in reverse order, i.e. case 1 is processed first, followed by cases 2 and 3, then case Z2, followed by cases 4 and Z3.

[0047] Alternatively, another sort order could be to start with the most recent, i.e. youngest case in the direct line of the selected case which would be case 4 in the situation shown in Figure 7, followed by the subsequent order cases in the same line except such an older subsequent case would be linked to another line. This is the situation for case 3 in Figure 7 being linked to case Z2 of the line of commission case chain 34. Therefore, case 3 is not the next case in the sort order but the most recent case in the parallel commission case chain 34 which is case Z3, followed by all the subsequent older cases until the case is reached which is linked to the previous line or chain. Then the sort order is continued in the initial line, i.e. with cases 3 to 1. This sort order is given in row 4 of Figure 5. Obviously, sorting is illustrated by means of rather low complex process chains, but it should be obvious that the principles laid down above according to the invention can be applied to much more complex data object chain networks with a plurality of links due to rebundled subobjects.

[0048] As a next step, the task list to be provided to the process module 22 is generated in preparation module 14 based on the grouped and sorted list of commission cases. The complete task list is illustrated in Figure 8, the numbers depicted in Figure 8 giving the previously described order of parking and resolving the cases.

[0049] In the example of Figure 8, case Z3 is parked first, then cases 4, Z2, 3, 2 and finally case 1. Case 1 is resolved and then the rest of the cases are resolved in the reverse order in which they were parked.

[0050] The order of the parking is the same as the order of the sorted cases of Figure 7. The commission cases are added to the task list and signed the action *park,* except for the initial case which is signed the action *park initial*. The cases are then copied in the reverse order to the task list and at the same time assigned the action *resolve,* except for the initial case which is signed the action *resolve initial*.

[0051] With the invention, it is possible to handle very large amounts of data. It differentiates multiple processing types, supports parallel administration of processes, protects mass processing against each other and against single processing.

[0052] Obviously, more than one data object can be selected as initial case and therefore, a grouped list can comprise more than one initial case which also applies to the task lists so that the actions *park initial* and *resolve initial* can occur more than once in a task list.

[0053] The process module 22 then processes the cases as specified in the task list. If more than one task list exists, each disjoined, it is possible to process two or more task lists in parallel.

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SAP 009 P-WO
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CLAIMS

1. A method for automated processing of data objects forming process chains of linked data objects in a data base of a computer system (10) comprising the steps of

after at least one initial data object to be processed has been selected, identifying at least one process chain (30, 32, 34) containing the selected data object to be processed;

determining all of the data objects which are linked with the selected data object in causal relation;

processing the determined data objects and the initial data object.

2. A method according to claim 1, wherein the step of processing comprises

resetting the determined data objects;

executing the desired processing of the initial data object; and

recalculating consecutively the determined data objects reset in the resetting step being in causal relation with the initial data object.

3. A method according to claim 2, wherein the step of processing comprises alternatively to the steps of resetting and recalculating the step of cancelling a determined data object.

4. A method according to any one of claims 1 to 3, wherein the data objects contain a time index and wherein

the processing of the determined data objects starts with the data object containing the most recent time index and steps back consecutively to the selected data object.

5. A method according to any one of claims 1 to 4, wherein all data objects are locked from access upon selection of a data object until termination of the step of processing.

6. A method according to any one of claims 1 to 5, wherein the step of determining includes grouping and sorting of the determined data objects.

7. A computer system for automated processing of data objects comprising

a computing unit (12); and

a data base (20) containing data objects forming process chains (30, 32, 34) of linked data objects;

the computing unit (12) further comprising

a selection module (16) allowing for selection of at least one initial data object;

a preparation module (14) for automatically identifying at least one process chain (30, 32, 34) containing the initial data object to be processed and for determining all of the data objects which are linked with the selected data object in causal relation;

a process module (22) for processing the determined data objects and the initial data object.

8. A computer system according to claim 7, wherein the process module (22) processes the initial data object as well as the data objects in causal relation with the initial data object.

9. A computer system according to claim 7 or 8, wherein processing in the process module (22) comprises resetting the determined data objects, executing the desired processing of the initial data object and recalculating consecutively the determined data objects reset in the resetting step being in causal relation with the initial data object.

10. A computer system according to claim 9, wherein processing in the process module (22) comprises cancelling a determined data object alternatively to resetting and recalculating.

11. A computer system according to any one of claims 7 to 10, wherein the data objects contain a time index and wherein the resetting of the determined data objects executed by the process module starts with the data object containing the most recent time index and steps back consecutively to the selected data object.

12. A computer system according to any one of claims 7 to 11, further comprising a locking module for locking all data objects from access upon selection of a data object via the selection module (16) until termination of the recalculation executed by the process module (22).

13. A computer system according to any one of claims 7 to 11, wherein the preparation module (14) provides for grouping and sorting of the determined data objects.

14. A computer program product with a computer-readable medium and a computer program stored on the computer-readable medium with program coding means which are suitable for carrying out a method according to any one of claims 1 to 6 when the computer program is run on a computer.

14. A computer program with program coding means which are suitable for carrying out a method according to any one of claims 1 to 6 when the computer program is run on a computer.

15. A computer-readable medium with a computer program stored thereon, the computer program comprising program coding means which are suitable for carrying out a method according to any one of claims 1 to 6 when the computer program is run on a computer.

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ABSTRACT

A method and a computer system for automated processing of data objects, the computer system comprising

a computing unit (12); and

a data base (20) containing data objects forming process chains (30, 32, 34) of linked data objects;

the computing unit (12) further comprising

a selection module (16) allowing for selection of at least one initial data object;

a preparation module (14) for identifying at least one process chain containing the initial data object to be processed and for determining all of the data objects which are linked with the selected data object in causal relation;

a process module (22) for processing the determined data objects and the initial data object, the processing preferably comprising resetting the determined data objects, executing the desired processing of the initial data object and recalculating consecutively the determined data objects reset in the resetting step being in causal relation with the initial data object.

(Figure 4)

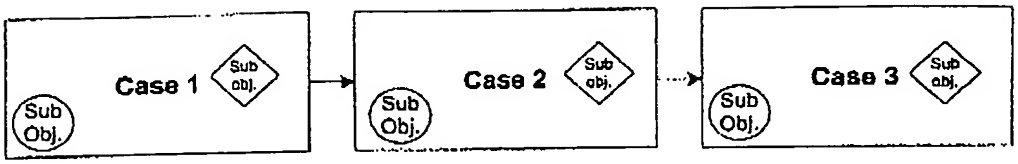
Case 1
Sub obj.
Sub Obj.
Case 2
Sub obj.
Sub Obj.
Case 3
Sub obj.
Sub Obj.

Fig. 1

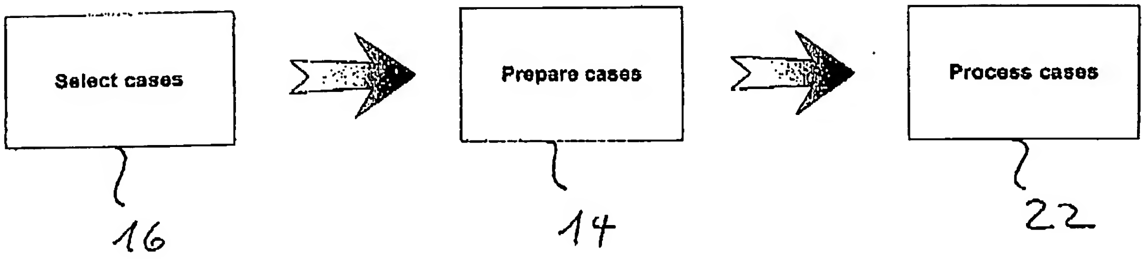
Select cases
Prepare cases
Process cases
16
14
22

Fig. 3

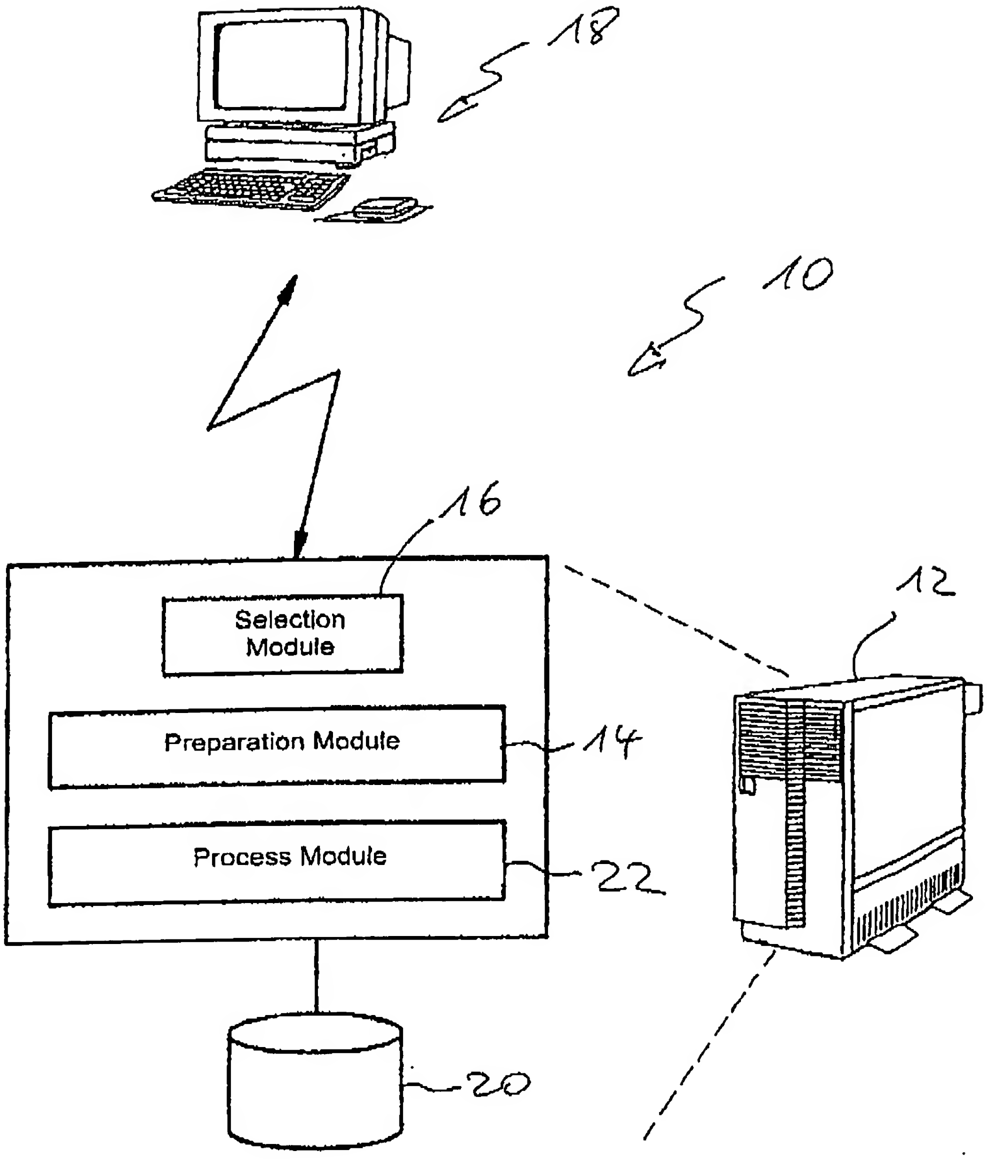
18
10
16
Selection Module
Preparation Module
14
Process Module
22
12
20

Fig. 2

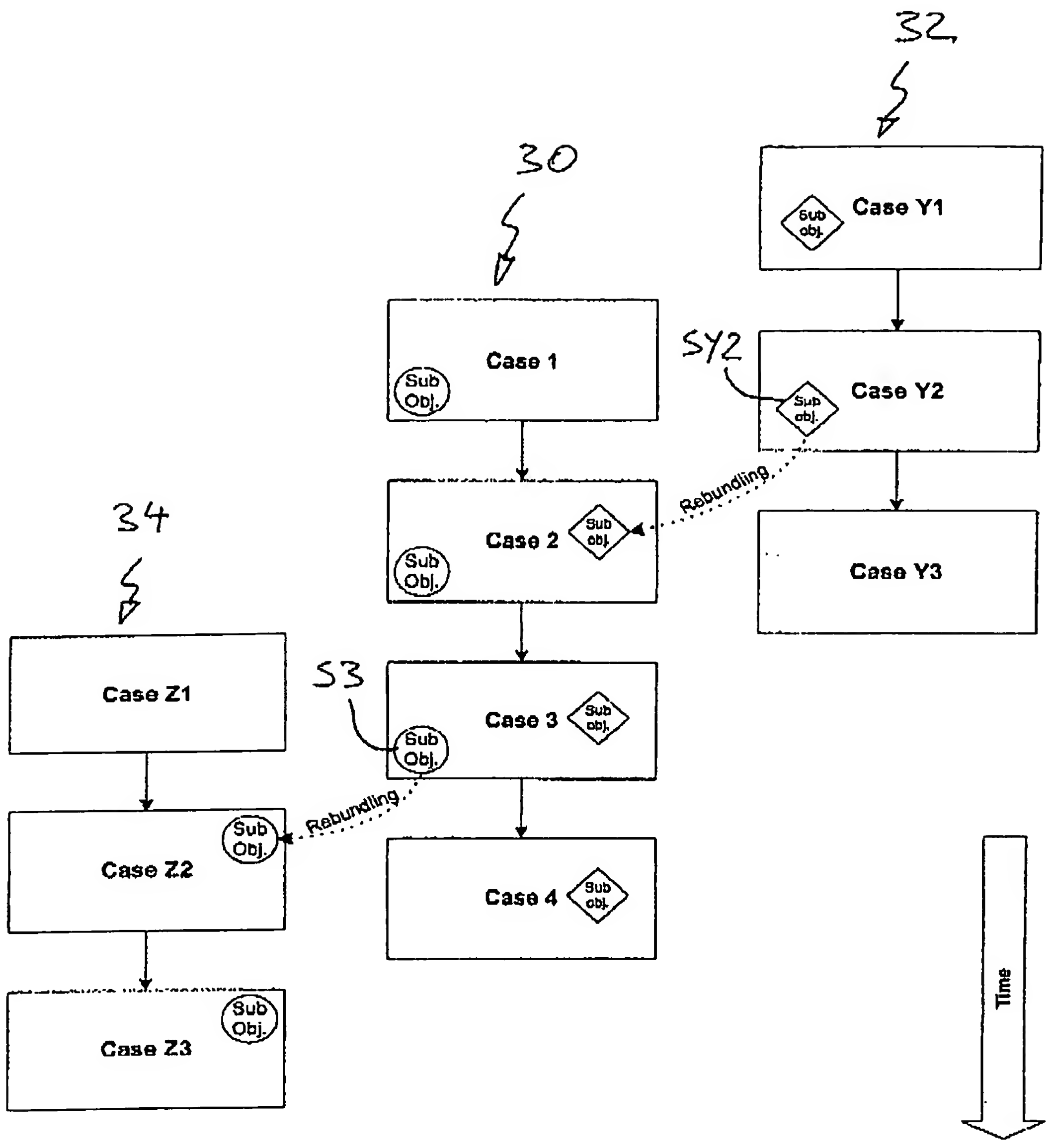
32
30
Case Y1
Sub obj.
Case 1
Sub Obj.
SY2
Case Y2
Sub obj.
Rebundling
Case 2
Sub obj.
Sub Obj.
Case Y3
34
Case Z1
S3
Case 3
Sub obj.
Sub Obj.
Rebundling
Case Z2
Sub Obj.
Case 4
Sub obj.
Case Z3
Sub Obj.
Time

Fig. 4

Initial case to update	Tasks
Case 4	PARK: 4 RESOLVE: 4
Case 3	PARK: 4, Z3, Z2, 3 RESOLVE: 3, Z2, Z3, 4
Case 2	PARK: 4, Z3, Z2, 3, 2 RESOLVE: 2, 3, Z2, Z3, 4
Case 1	PARK: 4, Z3, Z2, 3, 2, 1 RESOLVE: 1, 2, 3, Z2, Z3, 4

Fig. 5

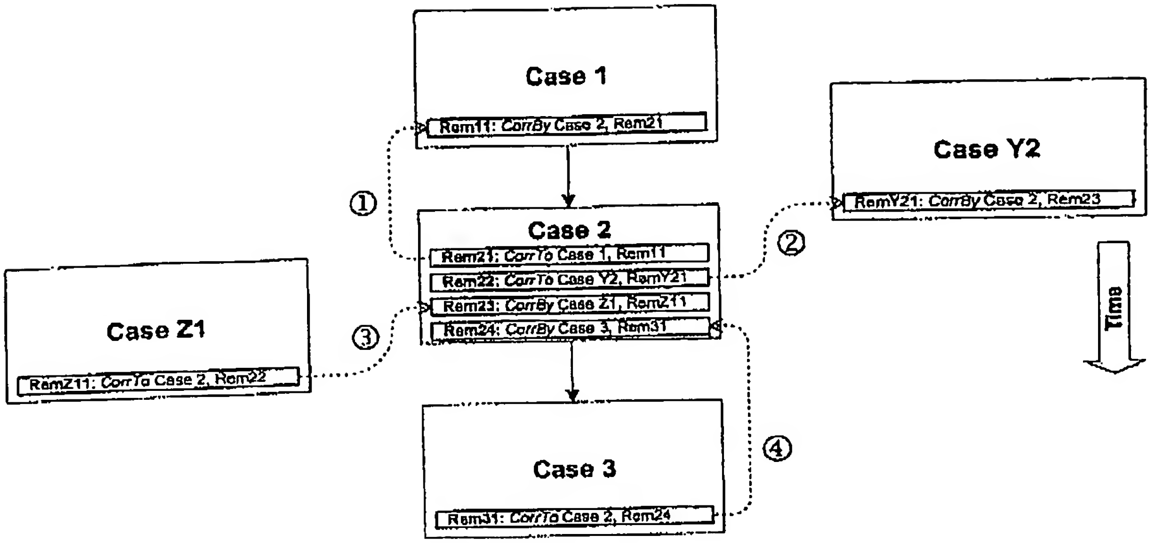
Case 1
Rem11: *CorrBy* Case 2, Rem21
Case Y2
RemY21: *CorrBy* Case 2, Rem23
①
②
Case 2
Rem21: *CorrTo* Case 1, Rem11
Rem22: *CorrTo* Case Y2, RemY21
Rem23: *CorrBy* Case Z1, RemZ11
Rem24: *CorrBy* Case 3, Rem31
Time
Case Z1
RemZ11: *CorrTo* Case 2, Rem22
③
Case 3
Rem31: *CorrTo* Case 2, Rem24
④

Fig. 6

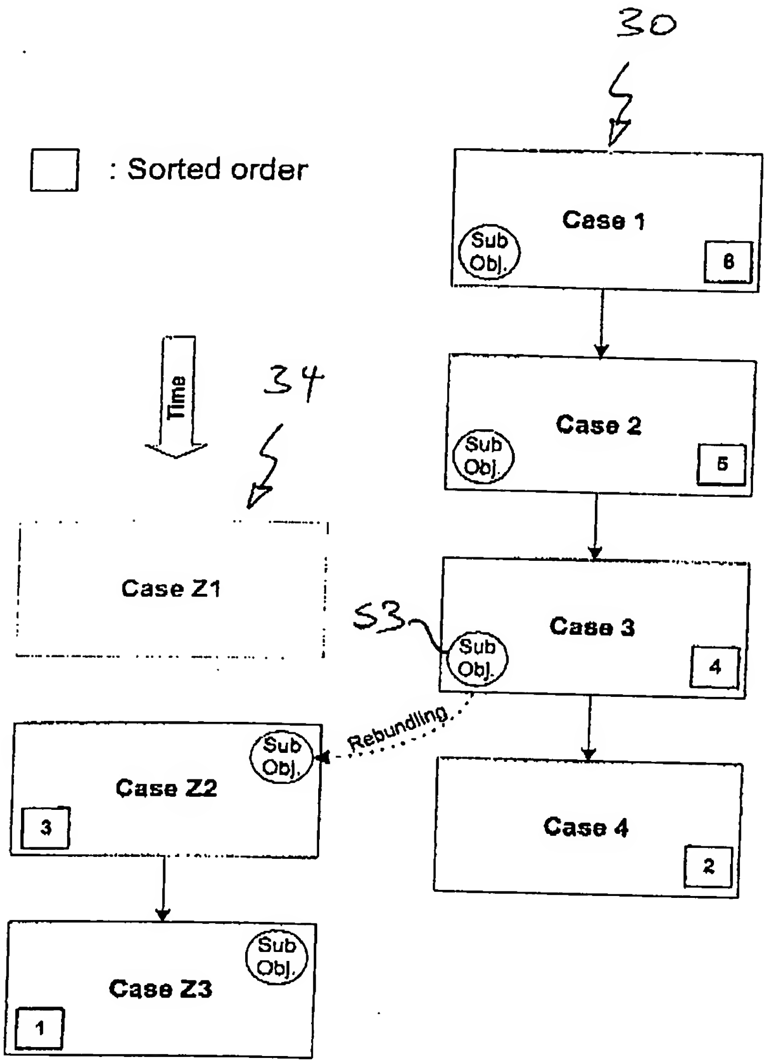
30
□ : Sorted order
Case 1
Sub Obj.
6
Case 2
Sub Obj.
5
Case 3
Sub Obj.
4
53
Case 4
2
Time
34
Case Z1
Case Z2
Sub Obj.
3
Rebundling
Case Z3
Sub Obj.
1

Fig. 7

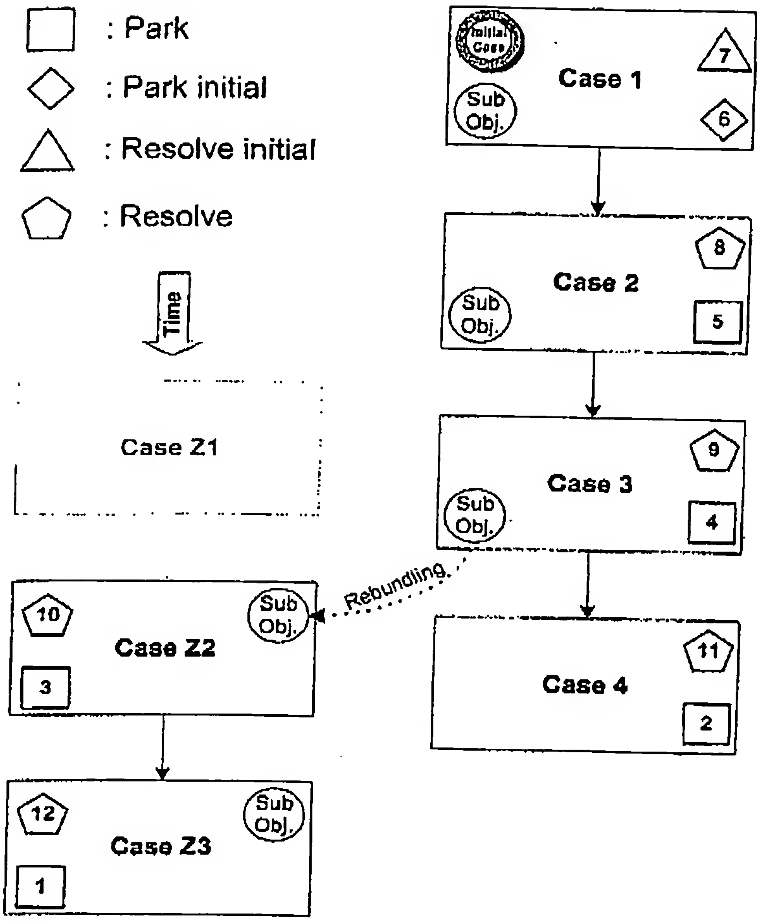
: Park
: Park initial
: Resolve initial
: Resolve
Time
Case Z1
Initial Case
Case 1
7
Sub Obj.
6
Case 2
8
Sub Obj.
5
Case 3
9
Sub Obj.
4
Rebundling
10
Sub Obj.
Case Z2
3
Case 4
11
2
12
Sub Obj.
Case Z3
1

Fig. 8